

RESEARCH AND TECHNOLOGY REPORT

1. Title Tactical Rover-based Martian Geologic Mapping				2. Date Prepared 09 29 2008																			
3. Performing Organization: Jet Propulsion Laboratory				4. NASA Current WBS#																			
5. JPL Project/Task Number: 102294 982745.03.16		(Per GSK Policy, this serves as the Work Authorization Document)		6. Awarded Years 2008-2009																			
7. Investigator Mark Powell		Telephone 818-653-8012		8. NASA Program Manager Joe Bredekamp																			
9. NASA Division																							
10. Reference(s): ROSES NRA Program Element Title: AISR Is this a Co-Investigator Task? yes Is this an Other than Solicited Task?																							
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">11. Funding Profile:</td> <td style="width: 15%;">FY'08</td> <td style="width: 15%;">FY'09</td> <td style="width: 15%;">FY'09</td> <td style="width: 15%;">FY'09</td> <td style="width: 15%;">FY'10</td> </tr> <tr> <td></td> <td>Approval</td> <td>Guideline</td> <td>Request</td> <td>Overguide</td> <td>Request</td> </tr> <tr> <td></td> <td>\$ 106.18 K</td> <td>\$ 76.4 K</td> <td>\$ 76.4 K</td> <td>\$ K</td> <td>\$ K</td> </tr> </table>						11. Funding Profile:	FY'08	FY'09	FY'09	FY'09	FY'10		Approval	Guideline	Request	Overguide	Request		\$ 106.18 K	\$ 76.4 K	\$ 76.4 K	\$ K	\$ K
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12. Description (Current year progress, next year's goals/objectives, publications) (If this is a final report, please state that as well) <i>Year 1 (2008) Accomplishments:</i> <ul style="list-style-type: none"> created morphologically accurate overhead mosaics of all rover Navcam imagery for Spirit and Opportunity and an automated pipeline to generate new mosaics for all future images created Map visualization capable of remote display of an entire rover mission investigation site co-registering HiRISE 25 cm base coverage with 1 cm rover Navcam coverage created and tested a localization correction system that specifies tiepoints of rover positions to HiRISE map coverage with an interactive drag and drop UI created bulk correction capability to perform localization correction on traverse location collections of arbitrary size Iterative refinement of the technology this year have resulted in a correction process that is even faster than we had originally estimated. Testing results demonstrate it is possible for a geologist to correct 4 years worth of mission traverse locations in one day (Tim Parker's results on correcting the Opportunity traverse bear this out) Impact on Mars Exploration Rovers and Mars Science Laboratory operations: <ul style="list-style-type: none"> have already delivered the Map visualization to both MER science and engineering teams, already seeing considerable use in operations Map products from this effort have been used this year by Larry Crumpler (Long-term planning lead and Geology Theme Group for Spirit) and Tim Parker (Geology Theme Group for Opportunity) to provide regional context for science to date and to plan future activities for the rovers have delivered the Map visualization as part of the MSL activity planning subsystem for use in MSL operations in 2010 and in science team training/testing leading into 2010 MSL mission operations subsystem team leads are discussing how best to take advantage of interactive localization correction in operations. There is likely to be some focused testing during upcoming operational readiness tests (ORTs) to try out various operations procedures and 																							

methodologies to learn how to maximize the effectiveness of this technology for the mission.

Objectives for Year 2:

- Create a definitive ground truth localization database from expert knowledge for Spirit (possibly Opportunity also)
- Publish these results in conference paper and presentation
- Investigate the coregistration of DEM information in the mapping process
- Possibly investigate a 3D visualization capability to enhance the Map visualization to encompass elevation corrections in addition to lat-long corrections

Approval:

Date:

Concurrence:

Date: